

Routine total-body CT for trauma room patients—life saver or needless radiation exposure?

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To scan or not to scan, that is the question. Within the last two decades, in case of multiple trauma patients, this question has been more and more answered with a definite yes as most trauma surgeons believe that total-body CT scanning results in a survival benefit. This is expressed e.g., by the fact that the Annual Report of the Trauma Register of the German Society for Trauma Surgery reveals that 78% of all severely injured patients received total-body CT scan in 2015 (1). However, significant proof for this assumption can hardly be found in literature. Interestingly, only 36% received chest X-ray according to this database and this percentage has been declining over the years. In 2009, an important paper was published in *Lancet* by Huber-Wagner and his colleagues, pointing out that survival in multiple trauma patients was better when they received a total-body CT scan in the early resuscitation phase (2). Points of criticism for this study contained the usual suspect—retrospective design, preselection of patients with an Injury Severity Score of ≥ 16 and more. Still the number needed to treat was low with 17–32 and the benefits of CT scanning outweigh the potential harm by radiation. This conclusion is based on the assumption that the radiation dose from total-body CT is 10–20 mSv, which results in an estimated lifetime cancer mortality of about one in 1,250 or 0.08% for 45-year-old people (3). The most crucial point is the early identification of patients with suspicion of severe injuries that will benefit from CT scanning as the indiscriminate use for patients with minor injuries can cause serious radiation overdose and is not justified.

Therefore prior to the recently published study by Sierink *et al.* (4) there was a clear need for further randomized controlled trials on the true benefit of early whole-body CT scanning in patients with suspicion of severe multiple

trauma. The above mentioned study consists of a well-structured RCT with immediate total-body CT as interventional and standard work-up with selective use of CT as control arm. Since we are all aware of the difficulties in conducting RCTs in multiple trauma patients, especially when hemodynamically instable patients are included, the authors have to be extremely commended for their work. Overall 5,475 patients at four centers were screened and 1,403 were assigned with 541 and 542 finally included in the primary analysis. These numbers allow for a valid comparison of the effect of total-body CT on in-hospital mortality which did not differ significantly (16% for each group). Neither the subgroups with proven traumatic brain injury nor the subgroups with proven multiple injuries showed different results. According to this data it is reasonable to state that an immediate routine total-body scan for every single patient that arrives at the trauma room with suspicion of severe injury will lead to unnecessary radiation exposure. On the other hand, the risk for missed injuries that can be life threatening cannot be underestimated when a CT is not performed initially. Other aspects that have to be considered are the time benefit from an immediate total-body scan and treatment costs. In the present study total-body scan yielded to an 8 min faster time to diagnosis of life-threatening injuries while costs were comparable in both groups.

Taken together, the wide and increasing use of total-body CT scans in polytrauma management over the past years might have over diagnosed some or even many patients, but rescued the one or other patient with unexpected injuries. Still in patients with severe thoracic, abdominal or pelvic injury an immediate CT scan from head to pelvis is the only way to get the potential life threatening injuries fast and comprehensive. Every emergency physician that

decides not to scan must be aware of this fact and intensive care monitoring during the early clinical course should be mandatory for these patients. It still seems to be clear that not every patient needs an immediate total-body scan. While we can express general guidelines for the use of CT scans, e.g., high velocity injuries or impaired consciousness (5), the individual decision will also be based on the physicians experience as always in medicine. The further distinction of selection criteria for patients that will benefit from scanning should be subjected to future research, which is exactly the authors' conclusion.

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Footnote

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Comment on: Sierink JC, Treskes K, Edwards MJ, *et al.*

Immediate total-body CT scanning versus conventional imaging and selective CT scanning in patients with severe trauma (REACT-2): a randomised controlled trial. *Lancet* 2016;388:673-83.

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